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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/700,316	11/14/2000	Lars-Olof Ohberg	69993-254103	4171

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EXAMINER	
LEE, BENJAMIN WILLIAM	

ART UNIT	PAPER NUMBER
3714	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/700,316	OHBERG ET AL.	
	Examiner	Art Unit	
	Benjamin W. Lee	3714	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *18 and 20-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18 and 20-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The amendment filed 02/19/2008 has been entered. Claims 18 and 20-30 are pending in this application. Claims 18, 23, and 27 have been amended.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 18, 20, 21, 23-25, and 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eldridge (US 5,228,854) in view of Schroeder (US 5,631,830).

Re claims 18, 20, 21, 23-25, and 27-30: Eldridge discloses a method of simulating a missile with a missile simulator during testing of an aircraft which includes a weapons system for controlling missiles with which the aircraft may be equipped (see Figs. 1 and 4; col. 3, lines 23-39; col. 4, line 44 - col. 5, line 11), the method comprising generating a target seeker command position for a simulated target seeker to command, whereby the simulated target seeker is commanded to adopt a predetermined position (see col. 5, lines 40-44; col. 8, lines 38-57), receiving the target seeker command position from the missile simulator at the weapons system (see col. 5, lines 55 - col. 6, line 20), wherein the simulated target seeker is assumed to move at finite speeds (see col. 6, lines 10-14; col. 9, lines 36-41) and that its movement is constrained to a single plane (see col. 5, lines 55-67), and simulating behavior of the missile in a computer model to generate an actual value signal adapted to the weapon system (see col. 5, lines 55-62; col. 6, lines 55-60). The simulated target seeker is assumed to move at finite speeds because the missile model is updated according to the changing position of the target and the movement of the simulated missile is constrained to a single plane that is perpendicular to the target. Eldridge further discloses computer circuitry operable to run a computer model of a missile (see ref. nos. 172 and 174 in Fig. 4; col. 9, lines 31-36) and interface circuitry communicatively connectable between the computer circuitry and a weapons system of an aircraft (see ref. no. 504 in Fig. 4; col. 6, lines 51-68). Eldridge further teaches that the missile may be partially guided by the radar system of the attack aircraft (see col. 7, lines 3-10).

However, regarding claim 18, Eldridge fails to disclose generating in the weapon system a trouble signal from a deviation between the target seeker command position and the actual value signal (including amplitude and phase angle of the simulated missile), measuring the

trouble signal by an interface module and from the measured continuous trouble signal determining sampled values for a vector indicating errors in amplitude and phase, which represent a difference vector corresponding to the target seeker command position and a vector corresponding to the actual value signal, are determined and sent to the computer model in the missile simulator, using the trouble signal as a control signal for the simulated target seeker, and repeating the control system steps. Regarding claims 23 and 27, Eldridge fails to disclose generating a signal representing a deviation of a simulated target seeker form a commanded position of the simulated target seeker, using the deviation signal in the missile computer model, and sending the actual value signal to the computer model.

Schroeder teaches a conventional missile control system. The conventional missile control system measures the actual value signal/measured dynamic response 205 of the missile and determines a trouble signal/error signal 220 by comparing the dynamic response 205 to a target seeker command position/commanded dynamic response signal 215. The target seeker/autopilot controller 225 then uses the error signal 220 to actuate the control devices of the missile in order to guide the missile towards the target (see Fig. 2; col. 2, lines 6-26).

Therefore, in view of Schroeder, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the missile control system of Schroeder in the weapons system of Eldridge in order to provide a realistic simulation of the control system of a conventional missile.

Regarding the limitations added on 07/26/2007 (i.e. "single aircraft" and "in the missile simulator" in claim 18, "using a missile simulator in a single aircraft" in claim 23, and "used in a single aircraft" in claim 27), replacing the target pod of Eldridge with a simulated target and

moving the simulation to the attacking plane would have been a simple substitution of one known element for another to obtain predictable results. In the field of simulation and testing, it is well known in the art to test actual components by feeding the actual component simulated inputs. For example, the previously cited Watson reference ("Distributed Simulation Testing for Weapons System Performance of the F/A-18 and AIM-120 AMRAAM") mentions Hardware in the Loop (HWIL) testing, which is a technique used to test embedded systems by feeding simulated inputs to an actual control system and using the outputs in a simulation to generate new inputs. It would have been obvious to one of ordinary skill in the art to use a simulated target instead of an actual target in order to reduce the overall cost of the system (it will require one less plane and simplify the overall operation of the system). Furthermore, simulators in which the simulation occurs on one apparatus instead of two are old and well known in the art.

5. Claims 22 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eldridge as modified by Schroeder as applied to claims 18 and 23 above, and further in view of Phillips (Feedback Control Systems, 3rd ed.).

The teachings of Eldridge as modified by Schroeder as applied to claims 18 and 23 above have been discussed.

However, the teachings of Eldridge as modified by Schroeder as applied to claims 18 and 23 fail to disclose or fairly suggest a time-continuous actual value signal is reproduced from a time-discrete vector from the computer model.

Phillips teaches a method of modeling a feedback control system comprising time discrete signals (see p. 468).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the missile control system described by Schroeder by applying a linear time-invariant discrete feedback system, in light of the teachings of Phillips, in order to allow modeling of digital controllers that can accept information only at discrete values of time (see p. 469).

Response to Arguments

6. Applicant's arguments filed 02/19/2008 have been fully considered but they are not persuasive. The examiner respectfully disagrees that the applicant's arguments and amendments overcome the prior cited art.

A. Eldridge does not describe a simulated target seeker

The system of Eldridge simulates the firing of ordnance (e.g. missiles). The ordnance that is simulated may include missiles with "infrared or other tracking capabilities (see col. 5, line 67 - col. 6, line 3). Thus, a simulation of a missile with tracking capabilities must include a simulated target seeker.

B. Eldridge does not describe receiving the target seeker command position from the missile simulator at the weapons system which is disposed at the same aircraft as the missile simulator

Some of the simulated missiles may rely on the radar of the attack aircraft (see col. 6, lines 3-10). Thus, for the missile simulation of such missiles, the targeting system of the attack aircraft must be used to give an accurate simulation of the firing and subsequent tracking of the missile. The

missile simulation must also be constantly updated with targeting information from the attack aircraft since the missile's target may dodge the attack aircraft's radar targeting (see col. 6, lines 6-14). The applicant is correct that Eldridge does not teach that missile simulator and the weapons system are positioned on the same aircraft. However, the examiner accounted for this difference in the previous rejection and the current rejection in the paragraph dealing with the limitations added 07/26/2007.

C. Eldridge does not describe simulating behavior of the missile in a computer model in a the missile simulator in which the computer model is positioned in the same aircraft as the missile simulator

The applicant is correct that Eldridge does not teach that missile simulator and the weapons system are positioned on the same aircraft. However, the examiner accounted for this difference in the previous rejection and the current rejection in the paragraph dealing with the limitations added 07/26/2007.

D. Eldridge does not describe simulating behavior of the missile in a computer model in a launching aircraft by repeating steps as disclosed in claim 18 to control the computer model towards a target by the target seeker

Eldridge teaches that the weapons system of the aircraft sends initial direction and velocity of the missile and other lock-on information (see col. 5, lines 40-44) and that the system may simulate the firing of missiles which use guidance systems of the attack aircraft (see col. 5, line 67 - col. 6, line 20). The applicant is correct that Eldridge does not disclose the specifics of how the

missile model simulates the guidance of a missile to simulate behavior of a missile launched at a target. However, the examiner cited Schroeder in previous rejections and the current rejection to teach such control systems for missiles are old and well known in the art. Using a control system to correct errors in the position vector of a missile, or any moving object, is old and well known in the art. As explained in the body of the rejection, Schroeder teaches a conventional missile control system that corrects errors in the position vector, including amplitude and phase angle.

E. Schroeder does not cure any deficiency of Eldridge

Schroeder teaches the use control systems to correct errors in the position vector of a missile. As explained in the rejection above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to simulate the firing of a missile in the system of Eldridge using a simulated control system to correct errors in position vector of a missile.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Benjamin W. Lee whose telephone number is 571-270-1346. The examiner can normally be reached on Mon - Fri (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pezzuto can be reached on 571-272-6996. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. W. L./
Examiner, Art Unit 3714

/Ronald Laneau/
Supervisory Patent Examiner, Art Unit 3714
05/27/08